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SWIMMING CARIBOU. BIRCHY PONDS, NEWFOUNDLAND.

Antlers of the stag on the right of the photograph, from which the velvet was stripped, were bright red, while from the antlers of the other stag, the velvet hung in strips.

Photographed from a canoe, September 14, 1900, and copyrighted, 1902, by R. T. Varnum.

THE CARIBOU

By MADISON GRANT
SECRETARY OF THE NEW YORK ZOOLOGICAL SOCIETY

REPRINTED FROM THE SEVENTH ANNUAL REPORT
OF THE
New York Zoological Society

NEW YORK
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1902

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THE CARIBOU

BY MADISON GRANT.

THE name caribou is one of the few names manufactured by the American pioneers to describe an animal found here. Unlike the name moose, which is of Indian origin, caribou is a modern French-Canadian corruption of "*carré-bœuf*"—or square ox—a word not without a certain descriptive power. The Algonquin equivalent is *an-en-a-dik*.

The term "caribou" is properly applied to all the American species of the genus *Rangifer*, while the word "reindeer" is limited to the old-world forms. In Europe, however, the latter name covers the entire genus.

The origin of the word reindeer is of considerable interest. The first syllable, *rein* in English, *raine* in Dutch, *renne* in French, and *renn-thier* in German, are not only equivalents, but are also related to the Latin-French form *rangi*-fer. The Lapp word *reino*, meaning pasturage, should also be noted. Curiously enough, the second syllable of rein*deer*, renn*thier*, and rangi*fer* are also of a common origin. Beginning with the Greek *therion*, a wild beast, we have Latin *ferum* by the metamorphosis of the *th* into *f*, and both equivalent to *thier* in German; and this latter by a similar transformation of the *th* into *d*, becoming *deer* in English.

CLASSIFICATION.

Before going into a detailed description of the genus, it may be well to briefly summarize the different classifications which

obtain at present, but which will probably be subjected to considerable alteration in the future by new discoveries. Many of the species, especially those of the extreme north of America, are rapidly diminishing in numbers, and it is most important that they should be thoroughly studied at once.

In describing the genus *Rangifer,* European naturalists have until recently held that there was but one species with a circumpolar distribution. Lately, however, they have partly yielded to the American view, and admitted the existence of either two or three distinct species. In the former case they identify the old world reindeer with the Barren Ground Caribou, to which indeed it is closely allied. Judge Caton made a very serious error in identifying the reindeer with our Woodland Caribou.

The most recent European classification is as follows:

1. *Rangifer tarandus typicus,*
2. " " *spitzbergensis,*
3. " " *caribou,*
4. " " *terraenovae,*
5. " " *groenlandicus,*
6. " " *arcticus.*

The differences between these types entitle them, under this system, only to sub-specific rank. This classification separates the Spitzbergen form from the typical Scandinavian reindeer, chiefly on the ground of its smaller size, but ignores the existing Siberian forms, concerning which very little authentic information is available.

The writer believes that all the existing species should be divided into two groups:

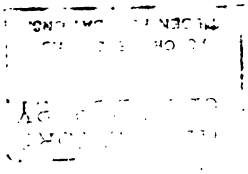
I. The Barren Ground Caribou.
II. The Woodland Caribou.

and that the species should be classified as follows:

I. BARREN GROUND CARIBOU.

a. European species.

1. *Rangifer tarandus,*	Northern Europe and Siberia.
2. " *spitzbergensis,*	Spitzbergen.
3. Undescribed Siberian races,	Siberia.



OSBORN'S CARIBOU (*RANGIFER OSBORNI*, ALLEN).

Photographed by I. Stone, in the Cassiar Mountains, B. C., Autumn, 1897.

b. American species.

1.	*Rangifer groenlandicus,*	Greenland.
2.	" *pearyi,*	Ellesmere Land.
3.	" *arcticus,*	Extreme north of America and the Arctic Islands.
4.	" *granti,*	Alaskan Peninsula.
5.	" *stonei,*	Cook Inlet.
6.	Undescribed American races.	

II. WOODLAND CARIBOU.

American species.

1.	*Rangifer terraenovae,*	Newfoundland.
2.	" *caribou,*	Canada, Maine, west to Manitoba.
3.	" *montanus,*	Rocky Mountains from Idaho to Central British Columbia.
4.	" *osborni,*	Cassiar Mountains of British Columbia, northward.
5.	Undescribed American forms,	Alaska and Arctic Canada.

These types will be considered in detail further on.

BASIS OF CLASSIFICATION.

All classification is, in the first instance, a question of definition. To-day, nearly all the large North American mammals are undergoing a systematic revision. There is a wide divergence of opinion as to whether or not certain departures from accepted types should be recognized as species, or merely as local races. The determination of this question naturally depends upon the importance attached by different zoologists to the characters upon which distinctions are based.

Most of the distinctions between caribou species are based on size, color, and antler development. The writer is perfectly aware of the uncertainty of any of these tests. Size alone does not often form a sufficient reason for specific distinction. Color, especially in an animal subject to seasonal variations, is apt also to be an uncertain factor, and the warning of Linneus—*ne nimium crede colori*—has been too often ignored by zoologists.

Antler development is, if anything, a more variable quantity than either of the preceding characters. There is a wide range of irregularity in the antlers of all deer, reaching what is perhaps

its maximum among the various groups of caribou. Animals in the same herd may differ widely in this respect. Even the antlers carried in the successive years of an animal's growth may, and often do, vary; and the two antlers on the same animal may not be symmetrical. Nevertheless, within the extreme limits of this irregularity there are certain types of architecture which, though clearly defined, are difficult to describe. This is true of nearly all the genera of the deer family.

The antlers of the Scandinavian elk and of the two species of moose are generally distinguishable, as are also antlers of the Virginia deer from certain localities. Furthermore, it is often possible to pick out moose antlers from the Rockies from those of Eastern Canada.

The above remarks apply to the caribou with peculiar force. The caribou from Newfoundland can be distinguished from those of the mainland by those who have sufficient experience in this matter, although the distinction might defy definition in words. The typical eastern forms of antler could not possibly be mistaken for a typical antler from the Northwestern United States, or from British Columbia. Selected specimens from each locality might be found closely approximating, but, nevertheless, the main statement remains true that one familiar with the modifications of caribou antlers could, in many cases, name the locality of a typical set of antlers.

When the antlers are distinguishable, and the color of the pelage of two animals at the same season is in marked contrast, and still further when there is added to these two characters a third—size—sometimes extremely marked, as between the Barren Ground and the Woodland groups, sometimes less extreme, as between the British Columbian forms and the Eastern Woodland, we have a group of variations clearly indicating that the extremes of the genus in the different portions of the range are at least well on the road toward forming distinct species.

When, in addition to the permanent variations in size, color, and antlers, well-marked anatomical features are found in the skulls or other part of the bony structure, the case in favor of specific rank becomes greatly strengthened.

When the ranges of two species adjoin or overlap, careful search must be made for intermediate and annectant forms. Such forms may be found among the western Woodland Caribou

—where it is within the possibilities that *R. montanus* and *R. osborni* merge, although there is as yet no evidence of this.

We have some twenty-odd specimens from the Cassiar Mountains, and all clearly indicate a species distinct from the southern form. We are not so fortunate in our specimens from the habitat of *R. montanus*. So far as known, all Alaskan Caribou belong to the Barren Ground group, in spite of the general impression to the contrary. *R. osborni* probably crosses the eastern border for a short distance. On the south coast of Alaska *R. stonei* is an isolated and clearly defined species, and unless specimens are discovered on the mainland it will probably be exterminated before we know much more about it. *R. granti*, inhabiting the extreme west of the Alaskan Peninsula, has, thanks to the agency of man, been separated from its nearest relatives, so that we have lost whatever forms there may have existed intermediate between it and its close kindred on the Arctic coast.

This last example is very suggestive of the manner in which species originated. A group of animals spreading over a large and diversified area slowly evolves variations in conformity with local conditions. As long as there is a continuous intermingling of all the members of the original group, the development of distinguishing characters is held in check. When for any reason this distribution ceases to be continuous, as by a severance of land connections, by the disappearance of water or forest in some particular tract, or by persecution by enemies, and the isolation caused thereby is maintained sufficiently long, the group is broken up, interbreeding ceases, and free play is given to tendencies toward divergence. Perhaps another change in local conditions occurs, resulting in the migration of one of the new groups back into the territory of another. If the isolation has continued sufficiently long to do its work, the two forms are distinct, and we have, side by side, two animals recognized as different species. Such is the case at the point where the range of the Barren Ground and the Woodland Caribou groups overlap. Such is the case in the West where the ranges of the black-tail and the white-tail deer overlap. Such is the case in Alaska, where members of the grizzly and brown bear groups range over the same country.

The case of the Virginia deer (*Odocoileus virginianus*) is in point. This deer ranges from Lower Canada and Maine, in

varying abundance, to the Gulf States and Mexico. In this enormous extent of country local conditions have produced their expected results. As we go south this deer becomes a smaller and more delicate animal, the antlers simpler and lighter, until a Florida or Mexican specimen placed beside one from Maine or Canada would show a degree of divergence in size, color, and antlers clearly sufficient to constitute a separate species. As a matter of fact, these outlying types are recognized as sub-species, and I greatly doubt whether a hunter starting in Quebec or New Brunswick, and securing a continuous series of specimens as he passed down through Maine and New England, through the Adirondacks and Pennsylvania along the line of the Blue Ridge to the Gulf States, and thence to Mexico, could at any point in his travels find the locality where one group ends and another begins. As he progressed, one type would fade into another, new characters appearing in an ever-increasing percentage of individuals. If, by some convulsion of nature, the deer of the Central States were destroyed and the Maine deer driven into Florida or Mexico—and such migrations have been common since terrestrial life first appeared—two valid species would exist in Florida. The Columbian Black-tail dwindling to the north into the Sitka deer furnishes a similar case.

These examples are parallel in the case of the caribou. Individuals taken from widely distant points on the Pacific coast show widely different characters. So do deer taken from Maine, Florida, and Mexico. In the case of the deer, we know that intermediate types exist, and yet different sub-species are recognized from the localities just mentioned. In the case of the caribou we do not know whether intermediate types exist or not. If they do not exist, the question of the specific distinction of the forms described in this article may be considered settled. If they are found to exist, their case will be analogous to that of the Virginia deer, and the so-called species will fall to the rank of sub-species or local races.

The distinction between a species and a sub-species is founded on this very point. Several groups of animals, presenting characters of a certain value, and without intermediate forms, constitute as many different species. Groups of animals with the same characters, but fading imperceptibly into one another, are recognized as sub-species. Many types recognized now as sub-

species are being rapidly raised to the rank of full species through the agency of man and his repeating rifle, and long before the last word on this subject has been said, the animals themselves, in many instances, will have disappeared.

DISTINCTION IN TYPE.

Before turning to the distribution of species, it may be well to briefly mention the several characters which distinguish the genus *Rangifer* as a whole from the other genera of the deer family.

All the members of this subdivision of the Cervidæ are extremely migratory in their habits, far more than any other deer, and consequently range over large areas. Their most distinguishing character, however, is to be found in the structure of the bones of the foot, where the so-called dew-claws attached to the ends of the metacarpal bones are functional, and are of use not only on glare ice, but in snow, and in the soft mossy bogs and barrens the caribou frequent. If the development of the metacarpal bones be given much weight, the nearest allies of this genus would be the moose and the American deer (*Odocoileus*). With the former, further affinity is suggested by the palmation of the antlers. Both the metacarpal structure and palmation, however, are probably cases of parallel development, and would not indicate any close relationship. The palmated antlers of the fallow deer present another example of such parallelism.

The presence of small horns on the females of this genus is in striking contrast to their absence in all the other members of the deer family. An effort has been recently made to show that in the ancestral deer antlers were present in both sexes, in which case their persistence among the caribou should be considered a primitive character. I cannot see any reason why this theory should be adopted in preference to the older view, which considered all antlers to be secondary sexual characters, and the antlers of the female caribou an acquired rather than a primitive character. This point remains, however, unsettled.

In the Woodland Caribou group one of the brow antlers is frequently enormously developed, projecting far down on the face, sometimes to the extremity of the nose, and serving as a guard to the eyes and face during the combats of the stags.

This development of one or both of the brow antlers is considered by some of the European naturalists to be so characteristic of the American Woodland Caribou that they rely upon it alone to distinguish the American Woodland from the Barren Ground Caribou, as well as from the old-world species. Several magnificent heads of the Barren Ground Caribou from Labrador, in the Smithsonian at Washington, show one heavily palmated brow antler, and consequently such palmation cannot be confined to the Woodland group. Among the Newfoundland species both brow antlers are occasionally heavily palmated, and almost symmetrical. This double palmation occurs in one out of six or eight heads, but is much more rare in the Woodland Caribou of the mainland, and apparently occurs but seldom among the Barren Ground Caribou.

FOSSIL FORMS.

The distinction between the two types referred to above as the Barren Ground Caribou and the Woodland Caribou is found not only among the existing species, but is clearly foreshadowed in the fossil remains found in the pre-glacial and inter-glacial deposits of the British Isles and continental Europe. The fossil reindeer found in the oldest Pleistocene deposits in Norway, Ireland, western and southern France, and in the Pyrenees are practically identical with the existing Scandinavian species. The Pyrenees were their extreme southern limit, and it is probable that they appeared there only as winter migrants.

In these deposits the antlers referable to the Barren Ground group are round, slender, and long in proportion to the small size of the animal, and the beam and the tines, including the brow tine, are but little palmated. The antlers of the Woodland Caribou group, on the other hand, are flatter, thicker, and more heavily palmated, both on the beam and tines, especially the brow antler, while the tine immediately above the brow antler, and corresponding to the bez-tine in the red deer (*Cervus*), is elaborately developed, and palmated in marked contrast to the same tine in the Barren Ground group. *The development of this tine, the writer considers to be the most distinctive character separating the two types.* There are also important differences in the angle of curve in the main beam. In Stone's Caribou this tine is of a

somewhat intermediate character. The fossil remains of the Woodland Caribou denote a larger animal, and this contrast in size holds good to-day between the existing species of the two groups.

DISTRIBUTION OF THE VARIOUS SPECIES.

At the beginning of the glacial period there was a land connection between Greenland, Spitzbergen, and Norway, which was in turn joined to Scotland and to Ireland, thence across England to the Continent; and it was over this land connection that the Arctic Barren Ground Caribou found its way into Western Europe. At that period, those portions of Russia lying between the Black Sea and the White Sea and the major part of Sweden were entirely submerged, as well as a large part of northern and eastern Germany. This condition prevented the spread of this group into Eastern Europe at that time. Its extreme eastern limit was near Berlin, where in one of the oldest Pleistocene deposits fossil remains of the Barren Ground Caribou have been found. At a much later period, probably during the interglacial phase of the glacial period, a land connection was established across Russia, and an invasion of Siberian mammals took place, bringing with it the Woodland Caribou. This animal pushed as far west as England, the north and east of France, but never reached either Scandinavia or Ireland, the latter having become detached from England at that time.

In the lands lying south of the Baltic this Woodland type abounded, increasing in numbers toward the east, but vanished before the historic period. Some member of the genus, probably the existing reindeer, persisted in the forests of Northern Europe until comparatively recent times, and were known to the Romans as inhabitants of the German forests. In fact, there is some slight evidence of the existence of reindeer in Caithness, Scotland, as late as the twelfth century.

All fossil remains found in Siberia and Eastern Europe are of the Woodland Caribou type, but all existing species found in Europe or Siberia to-day belong to the Barren Ground group, with the possible exception of a race in eastern Siberia, which may be found to belong to the Woodland group.

It thus appears that the separation of the two groups, the Barren Ground Caribou and the Woodland Caribou, dates from

pre-glacial times, and that the former entered Europe from the Arctic regions at a much earlier period than the latter. The Woodland Caribou, on the other hand, entered Europe from Siberia, and probably originated in Northeastern Asia, together with much of the fauna common to the Eurasian and North American continents, so that although no Woodland Caribou exists to-day in Europe, and while there is very little evidence of their existence in eastern Siberia, it is probable that they entered North America from the old world over the land connection, which, until recent times, existed across Bering Straits; and it was by this connection that North America received many of its best known animals—the wapiti, the bison, the mountain sheep, the grizzly and brown bears, the wolverine, and the lynx.

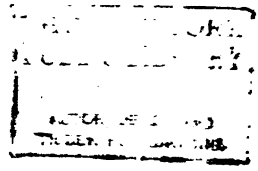
It may be noted in this connection that the fossil remains give us no good clew to the place of origin of the genus as a whole, but there is much negative evidence to indicate that it was in some Arctic land. In fact, all deer are clearly of northern origin.

The Barren Ground Caribou.

In contrast to the east Siberian origin of the Woodland Caribou, the original centre of distribution of the Barren Ground Caribou appears to have been in the north Atlantic region. Possibly this group entered America by way of Greenland. At present, species of the Barren Ground group are found throughout northern Scandinavia and Lapland, Spitzbergen and Nova Zembla, in suitable localities throughout Siberia, Alaska, the portions of North America east and west of Hudson Bay beyond the limit of tree growth, Greenland and the Arctic lands lying to the north of the American continent.

The Scandinavian reindeer (*Rangifer tarandus*) is of course the earliest and best known, and is the type of the whole genus. The domesticated race is smaller than the wild animals which still persist in the more inaccessible regions of Lapland. This relatively small size of the domesticated in contrast to the wild races also holds good in Siberia.

To the east of Lapland the reindeer extends throughout northern Russia and Siberia, in places as far south as the 54th parallel, and in the Ural regions as far south as the 52d parallel. Throughout this vast extent of country it is more than probable

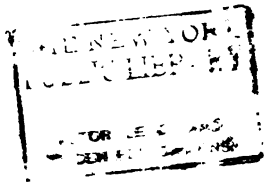


SIBERIAN REINDEER (*RANGIFER TARANDUS*, LINN.).

Height at shoulder, 39⅛ inches.

The New York Zoological Park.

IMPORTED DOMESTIC REINDEER IN ALASKA.
Photographed by Charles H. Townsend.



that there are well marked and distinct species, which could be established by a careful comparison of specimens from different localities. In fact, recent discoveries indicate the existence of several distinct races of both the wild and domesticated reindeer in eastern Siberia.

In the Government of Kazan it is said that the reindeer are of an exceedingly large size, and that the females are without antlers. A snow-white reindeer has been reported recently (1902) from the mouth of the River Lena. This may be a new species, or, more probably, merely the common form in its winter pelage.

To the north of the old world, reindeer are absent from Francis Joseph Land, but appear to abound in Nova Zembla and in Spitzbergen. The race in the latter islands (*Rangifer spitzbergensis*) has clear claim to specific rank, chiefly on the ground of its size, which is far smaller than the type race, but also on account of well-defined characters in the skull.

In America the different species of Barren Ground Caribou all lie to the north of the various members of the Woodland group. The Greenland race is a separate species (*Rangifer grœnlandicus*). Nearly all of the Parry Islands and other large land areas lying between Greenland and the mainland are inhabited by Barren Ground Caribou, formerly identified with those of the mainland (*Rangifer arcticus*).

A new Barren Ground Caribou from Ellesmere Land was described by Dr. J. A. Allen on October 31, 1902, under the name of *Rangifer pearyi*. Its chief character is in the coloring, which is pure white, except for a large dark patch on the middle and posterior part of the back. The new species is thus sharply defined from the darker caribou of Greenland. Its nearest relatives will be found among the caribou now grouped together under the name of *Rangifer arcticus*. It is very probable that investigations among the Parry Islands, and other land masses to the north of the continent, will disclose intermediate forms between these two.

Caribou, probably of this species, have been found as far north as the neighborhood of Fort Conger, Grinnell Land, in latitude 82°. It appears to be the northernmost member of the genus, and shares with the musk-ox and polar bear the distinction of being one of the few land mammals able to maintain

existence at that latitude. The Newfoundland Caribou had, before the discovery of this species, been considered the whitest of the caribou.

On the American mainland west of Hudson Bay the typical Barren Ground Caribou (*Rangifer arcticus*) is found in large herds throughout the barren grounds, migrating in winter into the timber belt as far south as the neighborhood of the Churchill River, latitude 59° north, and the southern end of Reindeer Lake.

That a portion of the herds remain along the northern coasts throughout the winter has been demonstrated by Mr. Andrew J. Stone. The recent investigations of this explorer have brought to light the interesting fact that the Mackenzie River, throughout its entire length, including a belt of land one hundred miles wide along its banks, is uninhabited by caribou, and appears to form the western limit of the *Rangifer arcticus.* To the west of the river the caribou are nearly twice the size attained by those on the east, and further explorations in that country will probably show this west Mackenzie caribou to be a new species. The caribou on both sides of the Mackenzie River, however, are threatened with extinction, owing to the increased number of whalers wintering on the northern coast. The natives are employed to bring in immense quantities of meat, and are supplied with fire-arms for that purpose.

The portion of northern Alaska drained by the Colville River is inhabited by a caribou which probably will prove on investigation to be a new species, possibly identical with the West Mackenzie form above referred to. The mountains to the north of the Porcupine River in Alaska are said to contain a *red caribou,* extremely rare, if not already exterminated. The caribou of the Kuskoquim River in southern Alaska is said also to be distinct, but is probably closely related to or the same as *R. stonei.* All these undescribed Alaskan caribou will probably be found to belong to the Barren Ground group.

Some five thousand domesticated reindeer from East Siberia have been introduced among the Eskimo of northwest Alaska. It is well within the probabilities that some of these animals may escape, and, in time, form a wild race. At all events such a possibility must hereafter be borne in mind.

In the autumn of 1901 Mr. Andrew J. Stone discovered a new species of Barren Ground Caribou on the Alaskan Peninsula,

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GRANT'S CARIBOU, ADULT FEMALE (*RANGIFER GRANTI*, ALLEN).
Length, nose to root of tail, 64 inches; height at shoulder, 42 inches.
Courtesy of American Museum of Natural History.

GRANT'S CARIBOU (*RANGIFER GRANTI*, ALLEN).
Length, nose to root of tail, 80 inches; height at shoulder, 44½ inches.
Courtesy of American Museum of Natural History.

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far beyond the western limit of tree growth. Fifteen fine specimens were secured, and described by Dr. J. A. Allen of the American Museum as *Rangifer granti.** A group of these animals is now being mounted at the American Museum. Mr. Stone states that this caribou inhabits the barren land of the Alaskan Peninsula, ranging well up into the mountains in summer, but descending to the lower level in winter, generally feeding on the low, flat lands near the coast and in the foot-hills. They formerly lived in considerable numbers on Unga Island, where they are now practically extinct. The only other island inhabited by them is Unimak Island, at the western end of the Alaskan Peninsula. Formerly they were exceedingly abundant, but of late they have been greatly reduced in numbers through the agency of the market hunters. The habitat of *R. granti* is thus an isolated area in the treeless portion of the Alaskan Peninsula, and (formerly at least) some of the adjoining islands at the western end of the peninsula. The nearest relations of the *R. granti* are to be sought on the barrens of northwestern Alaska, a district from which we have as yet no authentic specimens.

The caribou of the Kenai Peninsula, Alaska (*R. stonei*), is very much larger than *R. granti,* and appears to be the largest of the Barren Ground group. The animal has a totally different scheme of horn architecture, as may be seen from the accompanying cut, and shows signs of approaching the *R. osborni* and *R. montanus* toward the east and south. It is in fact an outlying member of the Barren Ground group, approximating to the Woodland group. Between *R. stonei* and *R. granti* there is no near relationship.

The caribou of the Kenai Peninsula, as stated above, constitute a well marked species of the Barren Ground type. It was described in May, 1901, by Dr. Allen, and named from the discoverer, Andrew J. Stone. As yet only three specimens are known. On the peninsula itself this fine animal seems to be on the verge of extinction, being now limited to one small herd, but it is highly probable it is to be found on the mainland west and north of Cook Inlet. A heavy bunch of white hairs in the front of the head and throat constitutes one of the most marked characteristics of this animal. The antlers are clearly of the Barren Ground Caribou type, but present two marked

* This species was named in honor of the author of this article.—EDITOR.

peculiarities. These are the extreme length of the tines on the upper part of the main beam, and a peculiar structure of the antler above the brow antler, which, taken alone, is not unlike the antlers of the American deer (*Odocoileus*). This animal is large, and by far the handsomest known species of the Barren Ground group. Its relationship to the caribou of the north and east cannot be determined until a full series of specimens is obtained.

Of the Barren Ground Caribou group there remains to be considered those of Labrador; but the caribou of the barren grounds to the east of the Coppermine River and north of Chesterfield Inlet need careful investigation, as do those of Southampton Island.

We are indebted to Mr. A. P. Low, the Canadian explorer, for most of the knowledge we possess of the interior of the Peninsula of Labrador, which includes one of the largest unexplored areas on the globe. Mr. Low states that there are three distinct herds of Barren Ground Caribou on the barren and semi-barren lands of the peninsula. These herds frequent the coast of Hudson Straits, Ungava Bay, and the Atlantic coast as far south as Hamilton Inlet. On the Hudson Bay coast they are found only at present in small numbers to the north of Whale River, about the 54th parallel, and are being rapidly exterminated by the Indians. It is probable that the Barren Ground Caribou of Labrador occupy at times the same area in the interior as the Woodland Caribou (*Rangifer caribou*).

An interesting question here arises as to whether the caribou of northern Labrador and those of Baffin Land are identical, and as to the possibility of crossing Hudson Straits, which lie between. Inasmuch as the Straits of Belle Isle appear to interpose a barrier sufficient to prevent the intermingling of the Newfoundland and mainland species, and as Hudson Straits are very much wider, and the probability of an ice bridge far more remote, it would seem that the two groups have been separated for a long period of time. It is highly probable, therefore, that future investigations will develop some distinctive features between the Labrador animals and those of Baffin Land and show a close relationship between the latter and the caribou of Ellesmere Land.

Mr. Arthur Moore, of New York, led an expedition into the Hudson Bay region during the summer of 1901 and obtained

Showing Distribution of Woodland and Barren Grou

MAP.

und Caribou in North America, with type localities of species.

caribou on the mainland of Labrador, and on Salisbury Islands, lying on the Baffin Land side of Hudson Straits. He writes me as follows:

"The tides are so swift, and their rise and fall so considerable, that the ice does not afford a practicable road. This view is supported by the further fact that there is, and has been, no communication between the Baffin Land and south shore Esquimaux. Moreover, where the land bridge is least broken, the shores are very bold, and consequently clear of permanent ice by reason of the most severe tide rips. The natural movement would be from the south, northward, as at the time of the spring migration the ice conditions would be most favorable after the winter's freezing; yet fewer caribou are reported on the islands off the south shore than off the islands on the Baffin Land coast.

"Salisbury Island is a large island, and is somewhat free from the strongest set of the Straits currents along its northern shore. The existence of Esquimaux on this island proves that it must be accessible from Baffin Land shore; yet even here, on the nearest and most accessible large island, communication has been so uncertain and difficult that from evidence drawn from the Salisbury natives I should judge that many years had elapsed since their arrival, as I could gather from them no knowledge of Baffin Land or any inhabited land in any definite location.

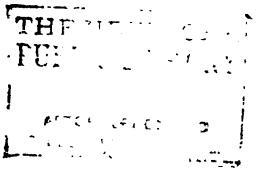
"Resolution Island, which is in sight of both Baffin Land and North Labrador, is never visited by Esquimaux, on account of the dangerous ice, and I imagine that few caribou ever travel to it, as men who have landed there say nothing of caribou, and I should expect to find such an island stocked with caribou that had migrated there from the more disturbed land inhabited by Esquimaux. In the latter case the hunters would soon follow, as the Esquimaux always follow migrating deer, and often they can go where the caribou cannot travel; consequently the absence of hunters on the south coast islands, even the larger land masses, would argue against the migration of caribou to these districts. The only argument in favor of migration across the Straits is the presence of caribou on Salisbury Island, which, as we have seen, is situated close to the Baffin Land coast."

Woodland Caribou.

The known range of the Woodland Caribou in North America extends from Newfoundland in the east, throughout Canada as far as the Cassiar Mountains of British Columbia and the Alaskan border in the west; and it is more than probable that the caribou known to inhabit the mountains west of the Mackenzie between the Dease and Pelly rivers belong also to this group. Passing over for the moment the Newfoundland species, the typical Woodland Caribou, *Rangifer caribou*, ranges from Nova Scotia through New Brunswick and Maine to the St. Lawrence River. In Maine their numbers have greatly declined in the last few years, probably from some unknown epidemic; and then, too, in spite of the excellent game laws of that State, which have adequately protected the other large mammals. It formerly existed in small numbers in northern Vermont and New Hampshire, but it may be stated in passing that there is absolutely no evidence of the existence of caribou in historic times in the Adirondacks, while there is much evidence of a negative character against it.

On the north of the St. Lawrence this animal extends throughout the entire Province of Quebec as far as the East Main River in Labrador. In the country to the north and east of Lake St. John, and on the southern watershed of Labrador, it has been nearly exterminated, presumably by the devastating fires which have swept over this district in recent years. West of Lake St. John it is found to the height of land and northward to James Bay and Hudson Bay, and in small numbers between these bays and Lake Superior. It was found in northern Minnesota, but I have been unable to verify Judge Caton's statement that in the early part of the century they occurred in small numbers on the southern shores of Lake Superior.

The Woodland Caribou extends westward throughout suitable forest areas in Manitoba, Saskatchewan, and Athabasca, to Great Slave Lake on the north. In the neighborhood of the Churchill River, west of Hudson Bay, the range of this animal and the Barren Ground Caribou from the north overlap at some seasons of the year, but there is no evidence of interbreeding. In west Canada it is holding its own well, owing to the fact that, unlike the Barren Ground Caribou, it does not gather in

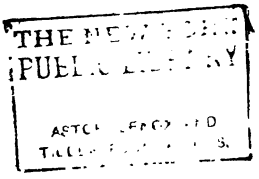


WOODLAND CARIBOU (*RANGIFER CARIBOU*, GMEL.).

Height at shoulder, 49⅜ inches.

The New York Zoological Park.

WOODLAND CARIBOU, ADULT FEMALE (*RANGIFER CARIBOU*, GMEL.).
Height at shoulder, 43 inches.
New York Zoological Park.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large herds. Throughout most of the range the Woodland Caribou inhabits the same country as the moose, although in the east it is generally found somewhat to the north of the latter.

The caribou of western Canada have until recently presented some serious taxonomic difficulties.

The mountains of northern Montana, Idaho, and Washington and the Provinces of British Columbia and Alberta are inhabited by a caribou which has long been known as the "Blackface" Caribou. This animal was thought to be identical with the eastern Woodland Caribou until, in August, 1899, Mr. Ernest Thompson-Seton described it as a new species under the name of *Rangifer montanus*, the type being a mounted specimen from Revelstoke, in the Selkirk range of British Columbia. The northern limits of its range are at present unknown, but it is possible that it fades gradually into the next species, *Rangifer osborni*. Nearly two years prior to the discovery of *R. montanus*, Mr. Andrew J. Stone killed in the Cassiar Mountains of northern British Columbia six specimens of a very large caribou, which were shipped to the American Museum of Natural History in New York, but were delayed on the way and did not reach New York until after the description of *R. montanus* had been published.

This new caribou from the Cassiar Mountains was generally considered to be identical with *R. montanus*, but the writer believed, from antlers of the Cassiar animal he had seen, that further comparison would result in proving them to be distinct species. To this end he secured for the American Museum four caribou from the type locality of *R. montanus*. As a result, the Cassiar specimens were described as *Rangifer osborni*, in honor of Professor Henry Fairfield Osborn. The *R. osborni* are found living throughout the year in the high mountains above timber line, and are the largest and handsomest caribou known—large males weighing from 550 to 700 pounds, and consequently approaching the wapiti in size.

A specimen killed in the summer of 1902 measured 4 feet 11 inches in height at shoulder and 7 feet 9 inches in length. This is one of the largest individual caribou of which we have authentic record.

Like most animals of the damp Pacific coast, both the *R. osborni* and *R. montanus* are very dark, the latter in fact almost

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as black as a moose. The antlers of Osborn's caribou are large and sweeping, and are characterized by large size, often palmation and prongs at the end of the main beam. The posterior prong on the main beam is nearly always very heavy. The brow antlers also are sometimes greatly developed. The range of this animal is probably much the same as that of Stone's mountain sheep, the southern limit in each case being the Rocky Mountain divide separating the head waters of the Peace and Fraser Rivers. On the north this splendid animal probably extends into Alaska and the head waters of the Yukon River.

Professor J. A. Allen describes the relations of *R. montanus* and *R. osborni* as follows:

"*Rangifer montanus,* in late September pelage, may be described in general terms as a black caribou, with the neck and shoulders, especially in the males, much lighter than the body and limbs; while *R. osborni,* in corresponding pelage, is a brown caribou, with much more white on the rump and posterior ventral surface, and the whole neck and shoulders, as well as the back and limbs, much lighter than in *R. montanus.*

"The specimens of *R. montanus* are without measurements, but the species is apparently about the same size as *R. osborni,* as shown by the measurements of the skull.

"In addition to the marked contrast in color, there are striking differences in the size and form of the antlers in the two forms, the antlers of *R. montanus* being of the typical Woodland Caribou type, and in their relative shortness and much-branched character recall strongly the antlers of *R. terraenovae,* but they are much lighter and more slender than in that species. They have the same abrupt upward curvature of the main beam, in contrast with the much longer and heavier and more depressed backward-sweeping main beam seen in *R. osborni.*"

NEWFOUNDLAND CARIBOU.

Toward the end of the Pleistocene period the Island of Newfoundland, extending over the now submerged banks to the southeast, was connected with Labrador over the Straits of Belle Isle, which even now are little more than nine miles wide. Between Newfoundland and Cape Breton and Nova Scotia on the west, the present Straits of Cabot formed part of a deep sea which

NEWFOUNDLAND CABIBOU FAWNS (*RANGIFER TERRAENOVAE*, BANGS).
The New York Zoological Park.

WOODLAND CARIBOU FAWN (*RANGIFER CARIBOU*, GMEL.).
The New York Zoological Park.

extended into the Gulf of St. Lawrence. This land connection to the north explains the distribution of fauna upon the island, especially the absence of moose, which on the north shore of the St. Lawrence appear to have never extended east of the Saguenay River into Labrador.

Until recently it was believed that caribou crossed the Straits of Belle Isle when they were occasionally frozen over, and that the type found on the island was considered to be identical with that on the mainland, forming at best no more than a well marked local race. It is now known that no such crossings occur. Since 1896 they have been recognized as a separate species of Woodland Caribou (*Rangifer terraenovae*), and until the discovery of the Cassiar Mountain Caribou were considered the largest and handsomest representatives of the genus. The nearest relatives of the *R. terraenovae* are of course the *R. caribou* of the adjoining mainland.

Two types of caribou are recognized by the natives of Newfoundland. The smaller variety inhabiting the southwest portion of the island south and west of Grand Pond, where the country is timbered with hard wood, is locally known as the "mountain caribou," and is said not to migrate. The antlers are for the most part much smaller than those of the larger and better-known animal in the east and north of the island. There is no satisfactory explanation of the existence of these two types, but there are many similar instances among the various members of the deer family. Some moose are short legged and thick bodied, with widely palmated antlers, in contrast to others which are taller and more rangy. In the Adirondacks a similar contrast is found between the ordinary deer and the meadow buck, or swamp deer. This swamp deer has a thick body, short legs, and black dorsal stripe. Its antlers, which sometimes present the bifurcated prong of the closely allied mule deer of the West, have a heavy beam and burr thickly studded with small knobs. These variations, however, must be confined to individuals, as both forms mingle freely, and in fact these special characters appear to be confined to the males. In Newfoundland, however, the smaller or mountain race inhabits a distinct locality.

The larger variety migrates annually, going north in the spring and returning in September, in bands of five to ten, seldom numbering over twenty-five. These bands are generally led

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NEWFOUNDLAND CARIBOU (*RANGIFER TERRAENOVAE*, BANGS).
Wild stag, photographed, 1902, on a Newfoundland barren,
by Charles D. Cleveland, and reproduced by permission.

NEWFOUNDLAND CARIBOU (*RANGIFER TERRAENOVAE*, BANGS).

Courtesy of C. Grant La Farge.

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by an old doe, while the "stags," as the bulls are called in Newfoundland, are usually found in pairs. Many of the finest stags, however, do not migrate, but remain on the high barrens of the south. The migratory habits of the animals have been greatly disturbed by the recently completed railroad, along the line of which a cordon of sportsmen formerly gathered in the fall, shooting at everything that passed. If this had continued a few years more the result would have been the separation of the caribou into two herds, as was the case of the buffalo when the Union Pacific Railroad first crossed the United States.

The velvet is shed during the first week of September, and for some time after the antlers are bright red in color, due not to dried blood, but to the rubbing of the antlers against spruce-trees and alders.

As a general thing, only those antlers which have a double brow antler count high in points, a point being defined as a knob upon which a watch can be hung. One of the handsomest and most highly prized types of antlers is locally known as the "going-back head," belonging to old stags on the decline; the beam is extremely massive, and the points short and numerous. Antlers with thirty points are considered to form a good head. Forty points are rare, and the days of the fifty-pointers appear to have passed, even if they ever existed. In the future the finer antlers will become increasingly rare, as one of the first symptoms of the decline of any given race of deer is the deterioration of antlers. In proof of this, witness the increasing scarcity of handsome wapiti heads. This also holds good of the moose of Maine and New Brunswick, where the best heads scarcely equal the average of those taken along the Upper Ottawa River. The antlers of the Scottish red deer are as inferior to those taken in the German forest as the latter are in turn inferior to Hungarian antlers from the same species. In all those countries, collections of antlers dating back several centuries show a tremendous decline in the best heads. Antlers in the castle of Moritzberg, near Dresden, dating from the sixteenth and seventeenth centuries, are so large that it is difficult to believe that the animals which bore them were of the same species as their degenerate descendants in the neighboring forests. This deterioration is chiefly brought about by long-continued elimination of the best stags, but too close inbreeding has probably aided the general decline.

A new game law was enacted in 1902 which shows a very earnest purpose on the part of the Newfoundland authorities to protect their magnificent herds of caribou. If the law can be enforced against the natives, as well as against the visiting sportsmen, the former indiscriminate slaughter of deer can be regulated, if not stopped. The difficulties of educating the natives of new countries to respect game laws are, it is needless to say, very great. The new law, however, organizes the local guides, and makes them to some extent responsible for the observance of the law. This is, of course, a great step in the right direction. The prohibition of water killing, a special close time during the migrating season, and the prohibition of hunting within five miles of the railroad, are also features which commend the new law very strongly to all interested in game preservation. The deer, however, have been so abundant in the past that they are still regarded by the natives as their chief supply of fresh meat, and it will be some years before the Newfoundlanders themselves come to realize that intelligent and efficient protection is in their own interest. This, however, is the history of the enforcement of game laws everywhere. The law itself must be in advance of public opinion, and complete enforcement of the law can only be achieved long after the statutes are on the books.

In closing the writer desires to acknowledge his indebtedness to Prof. J. A. Allen, to Mr. Andrew J. Stone for much of the information, and for many of the photographs which appear in this article, and to Mr. F. A. Lucas, of the U. S. National Museum at Washington, to Mr. A. S. Reed, of Victoria, British Columbia, to Mr. R. T. Varnum, Mr. Chas. D. Cleveland, Mr. Wm. T. Hornaday, Mr. C. Grant La Farge, and Mr. Arthur Moore, of New York, for illustrations.

PLATES.

GRANT'S CARIBOU		*Specimen in velvet.*
SIBERIAN REINDEER	Antlers.	Front view.
" "	"	Side view.
GREENLAND CARIBOU . . .	"	Front view.
" "	"	Side view.
BARREN GROUND CARIBOU . .	"	Front view.
" " " . .	"	Side view.
" " " Fort Chimo.	"	Front view.
" " " "	"	Side view.
GRANT'S CARIBOU	"	Front view.
" "	"	Side view.
STONE'S CARIBOU	"	Front view.
" "	"	Side view.
NEWFOUNDLAND CARIBOU . .	"	Front view.
" " . . .	"	Side view.
MOUNTAIN CARIBOU . . .	"	Front view.
" "	"	Side view.
OSBORN'S CARIBOU	"	Front view.
" "	"	Side view.
" "	Head	Front view.
" "	"	Side view.

GRANT'S CARIBOU (*RANGIFER GRANTI*, ALLEN).
Specimen in the velvet, from the Alaska Peninsula.
Courtesy of Charles H. Townsend.

SIBERIAN REINDEER (*RANGIFER TARANDUS*, LINN.).
Antlers; length of main beam, 40¾ inches; greatest spread, 33½ inches.
Courtesy of American Museum of Natural History.

Side view of specimen shown on opposite page.

GREENLAND CARIBOU (*RANGIFER GROENLANDICUS*, GMEL.).
Specimen from west coast of Greenland.
Antlers · length of main beam, 49 inches; greatest spread, 39 inches; total points, 22.
Courtesy of American Museum of Natural History.

Side view of specimen shown on opposite page.

BARREN GROUND CARIBOU (*RANGIFER ARCTICUS*, RICH.).
Specimen from northwest coast of Hudson Bay.
Antlers; length main beam, 42½ inches; greatest spread, 29½ inches; total points, 25.
Courtesy of American Museum of Natural History.

Side view of specimen shown on opposite page.

BARREN GROUND CARIBOU (*RANGIFER ARCTICUS*, RICH.).
Specimen from Fort Chimo, North Labrador.
Antlers; length of main beam, 58 inches; width of brow antler, 21 inches.
Courtesy of United States National Museum, Washington.

BARREN GROUND CARIBOU (*RANGIFER ARCTICUS*, RICH.).
Specimen from Fort Chimo, North Labrador.
Antlers; length of main beam, 60 inches; greatest spread, 34 inches.
Courtesy of United States National Museum, Washington.

GRANT'S CARIBOU (TYPE) (*RANGIFER GRANTI*, ALLEN).

Specimen from Alaska Peninsula.

Antlers; length along curvature, $33\frac{7}{8}$ inches; greatest spread, $35\frac{1}{8}$ inches; total points, 27.

Courtesy of American Museum of Natural History.

Side view of specimen shown on opposite page.

STONE'S CARIBOU (TYPE) (*RANGIFER STONEI*, ALLEN).

Antlers; length of main beam, 49 inches; greatest spread, 34 inches; total points, 36.
Courtesy of American Museum of Natural History.

Side view of specimen shown on opposite page.

NEWFOUNDLAND CARIBOU (*RANGIFER TERRAENOVAE*, BANGS).

Specimen from Red Indian Lake, Newfoundland.

Length, main beam, 41 inches; extreme width brow antlers, 36 inches; total points, 36.

Author's Collection.

NEWFOUNDLAND CARIBOU (*RANGIFER TERRAENOVAE*, BANGS).

Showing development of brow and bez antlers.

Length, nose to root of tail, 75⅝ inches; height at shoulder, 47 inches.

Antlers; length of main beam, 29½ inches; greatest spread, 28 inches; total points, 37.

Courtesy of American Museum of Natural History.

MOUNTAIN CARIBOU (*RANGIFER MONTANUS*, SETON).

Antlers; length of main beam; left, 35 inches; right, 32 inches. Number of points; left, 13; right, 18; total points, 31.

Greatest spread—21 inches.

Side view of specimen shown on opposite page.

OSBORN'S CARIBOU (*RANGIFER OSBORNI*, ALLEN).
Specimen from Cassiar Mts., B. C.
Antlers; length of main beam, 44 inches; greatest spread, 38⅛ inches; total points, 36.
Author's collection.

Side view of specimen shown on opposite page.

OSBORN'S CARIBOU (TYPE) (*RANGIFER OSBORNI*, ALLEN).
Length, from nose to root of tail, 82 inches; height at shoulder, 50 inches.
Courtesy of American Museum of Natural History.

OSBORN'S CARIBOU (*RANGIFER OSBORNI*, ALLEN).
Specimen from the Cassiar Mountains, British Columbia.
Antlers; right, 48 inches; left, 50½ inches; total points, 45.
Courtesy of A. S. Reed, Victoria, B. C.

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